

and we ourselves should be rather sanguine that by introducing the common pearls within the valves of the true pearl-mussel we should obtain good pearls. Lastly, is it possible to *improve* the mean-looking pearls produced in such quantities in some localities in the edible mussel? We have made a few experiments in this last direction; and though we have not made our fortune or taken out a patent, we have found that they really may be much improved by chemical means, some made quite ornamental. The method we have tried is boiling the pearls for a short time in a dilute solution of potash and afterwards letting them remain in it for a few days, noting that a very strong solution destroys their lustre instead of increasing it. These inferior pearls have been collected for sale for many years in the lower Conway; and we think it possible that they are afterwards submitted to some such process. The pearls which are obtained from the *Alasmodon*, between Llanrwst and Bettws-y-coed, are very different and need no such treatment; in fact some of those found have fetched a high price, and they appear to wear better than oriental pearls.

Late in August of this year I examined a dozen *Alasmodons*; none of them had the ova transposed to the branchiæ, though they were ejecting them from the oviducts. The pericardium could be made out to communicate with the suprarenal sacs, as Professor Rolleston, I think, was the first to ascertain. In the depth of the foot of the *Anodon*, at some distance before and below the pedal ganglion, is a little yellowish-brown body about the size of a mustard-seed, of a waxy consistence and formed of several *emboîtures*. We should consider this to be a rudiment of a byssus-gland rather than of the organ of hearing. There is also a curved band of yellowish thickened mantle below the hinge, which requires explanation.

Note on a Chinese Artichoke Gall (mentioned and figured in Dr. HANCE's paper "On Silkworm-Oaks") allied to the European Artichoke Gall of *Aphilothrix gemmæ*, Linn. By ALBERT MÜLLER, F.L.S.

[Read February 15, 1872.]

FROM the valuable "Supplementary Note on Chinese Silkworm-Oaks," by Dr. H. F. Hance (Journ. Linn. Soc. Botany, vol. xiii. No. 65) I select for consideration the following passages, which are of special interest as affording the first intimation of the occurrence of a cynipideous oak-gall new to science:—

“The larger trees, producing acorns, are called *Siang-li* (the generic name for the oak), whilst those that are smaller and do not produce acorns are called *Ts'ing-kang*. In its stem and foliage the *Ts'ing-kang* is altogether similar to the *Siang-li*; but the colour of its leaves is a lighter green, and its flowers less abundant” (p. 9). . . . “The *Ts'ing-kang* tree grows on hills interspersed with the *Tsiang-li* oak trees, being in fact of the same kind, but devoid of flowers and fruit. A green ball is frequently found developed at the extremity of its twigs, consisting of hairs as fine as the silky fibres of the *Tsung* tree (qu. a palm?), but somewhat tougher. . . . The plate annexed to the above description, a copy of which is here [*vide* p. 11] given, represents an oak with leaves like those of a shallow-lobed form of *Quercus robur*, and with three fruits (unless they are intended for the ‘oak-apple’ mentioned in the text), one distinctly stalked, the dense squamæ of the cupule entirely concealing the acorn, and looking like those of *Q. dentata*, Thunb., though closely appressed instead of being more or less reflexed” (p. 10).

“The oaks are never allowed to grow old here [Thong-kin-foo]; every eight or nine years they are cut down to the ground; the subterranean trunks throw up new shoots, which are again cut down after the lapse of another eight or nine years, so that the oak woods are merely copses” (p. 12).

Britain and China lie far apart; but, botanically speaking, the genus *Quercus* is a good link between the two countries. It is therefore worth while pointing out that with the aid afforded by the life-history of a British *Cynips* the extracts given above bear witness to the existence of a closely allied Chinese insect. What my friend Mr. Riley, the State entomologist of Missouri, properly styles “unity of habit,” points out the way. Since it has come to pass in Britain and on the continent adjoining that oaks are felled wholesale, and are almost everywhere replaced by copsewood, which has sprung up from their roots, an axillary excrescence called, from its resemblance to an artichoke, the “Artichoke Gall” has made its appearance in enormous numbers on the young oak-shoots. It is the cradle of a cynipideous fly named *Aphilothrix gemmæ*, Linn. (*Cynips fecundatrix*, Hartig). The numbers of this insect in Britain are now so great in some parts that they threaten to render many bearing oak trees altogether sterile. The parasitic Hymenoptera appointed to keep this *Cynips* in check are now altogether insufficient in numbers to cope with its rapid increase,

fostered, as the latter is, by man ever more and more extending the area of action in the destruction of timber and consequent growth of copses. Early in summer the female deposits its eggs in the axillary fruit-buds; in doing so it shows a decided preference for stunted or otherwise unhealthy bushes or undergrowth; but where its numbers are once great, full-grown trees become equally liable to infection. Each infected fruit-bud gradually assumes the form of a hop-bloom or artichoke-like excrescence, consisting of a series of elongated squamæ (representing the converted cupule) and centring on a short woody basal axis, the top of which is occupied by the stunted acorn. The squamæ generally conceal the acorn, which in this condition is only 6-7 millimetres in length, with a diameter of about 3 millimetres. By the end of September or beginning of the following month, the acorn having done duty for an "inner gall," drops out of its foliaceous covering. If it be examined at this time, the interior will be found to be converted into a spacious cell filled by the large white fat larva of the *Cynips*. In spring this larva changes to a sculptured pupa, which in early summer assumes the perfect winged state and then quits the acorn. In cases where a parasitic Hymenopteron has deposited its egg in the cynipideous egg or very young larva, the acorn remains very small (seed-like), and but seldom preserves its normal shape.

Réaumur knew these galls, and has described and figured them (*Mémoires*, t. iii. p. 463, tab. 43 & 44), and has been followed by numerous other observers; but I have ventured to refer to my own observations in preference, so as to bring out the salient points between the European and the Chinese species. I dismiss the notion of calling this latter gall an "oak-apple;" the two productions have not the slightest resemblance.

Turning now to its affinities with the "*galle en artichaut*" of Réaumur, I venture to call attention to the following points.

European form.

On *Quercus pedunculata*, *sessiliflora*, and *pubescens*; prefers young copsewood and stunted trees.

Exceedingly common. Axillary, sometimes at extremity of twigs. Shape of an artichoke or foliaceous

Chinese form.

On "*Ts'ing kang*," an oak with light-green leaves, in outline like those of a shallow-lobed form of *Q. robur*; on trees kept artificially in the copse-state.

"Found frequently developed." At extremity of twigs. "Green ball," but figured as a foliaceous cone.

European form.

cone. Colour, first green, then brown. Sometimes stalked.

Dense squamæ, representing converted cupule; generally concealing the acorn.

Squamæ closely appressed in the earlier stage of growth, less so when mature.

Acorn stunted, standing upright on a central axis. Acorn converted into a capacious larval cell, dropping to the ground in autumn.

Insect. *Aphilotrix gemmæ*, Linn. (*Cynips fecundatrix*, Hartig).

Chinese form.

"One distinctly stalked."

"Dense" squamæ ("of the cupule"?) entirely concealing the acorn. (No cupule is visible in the figure.)

Squamæ looking like those of *Q. dentata*, Thunb., though closely appressed, instead of being more or less reflexed. (The figure does not show them closely appressed.)

No evidence. (No acorn visible in the figure.)

Insect not known. *A Cynips?*

I have not taken any notice of the different Chinese localities whence the above facts were procured. The European *Cynips* has an extensive range; and its Chinese ally is not likely to be worse off in this respect.

It now behoves the residents on the spot to prosecute this inquiry; the naturalist at home has done his share by calling attention to the matter.

On the Geographical Distribution of the Diurnal Lepidoptera as compared with that of the Birds. By W. F. KIRBY, Assistant in the Museum of the Royal Dublin Society, author of 'A Catalogue of Diurnal Lepidoptera,' &c.

[Read February 15, 1872.]

THE preparation of my 'Catalogue of Diurnal Lepidoptera' has furnished me with materials for a paper on the general distribution of the group, which I have hitherto always shrunk from attempting. It happens that the number of species recorded slightly exceeds that of the number of birds as estimated by Dr. Selater* in his paper "On the general Geographical Distribution of the Members of the Class Aves" (Journ. Linn. Soc. Zool. vol.

* Gray now enumerates upwards of 11,000 species; but it is more convenient to take Selater's estimate in the present paper.